REMARKS

This communication is a full and timely response to the final Office Action dated June 4, 2010. Claims 1-4, 6-10, and 14-18, and 21 remain pending, where claims 5, 11-13, 19, and 20 were previously canceled. By this communication, claim 22 is canceled without prejudice or disclaimer to the underlying subject matter and claim 1 is amended.

In an interview conducted on August 12, 2010, the Examiner and Applicant's representative discussed the combination of the *Kuffer* and *Jonza* and the capacity of the embodiments disclosed therein to exhibit the "absorbency" and "emissivity" characteristics of the claimed embodiments and to exhibit any "thermal control properties" as embodied in Applicant's claims. No agreement was reached.

In numbered paragraph 1 on page 2 of the Office Action, claim 22 is objected to under 37 C.F.R. §1.75(c), for allegedly being of improper dependent form. Applicant respectfully traverses this objection. In an effort to expedite prosecution, however, the objection to claim 22 is rendered moot through its cancellation. Thus, withdrawal of this objection is respectfully requested.

In numbered paragraph 3 on page 2 of the Office Action, claims 1, 4, 6-10, 14-18, and 21-22 are rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. Applicant respectfully traverses this rejection.

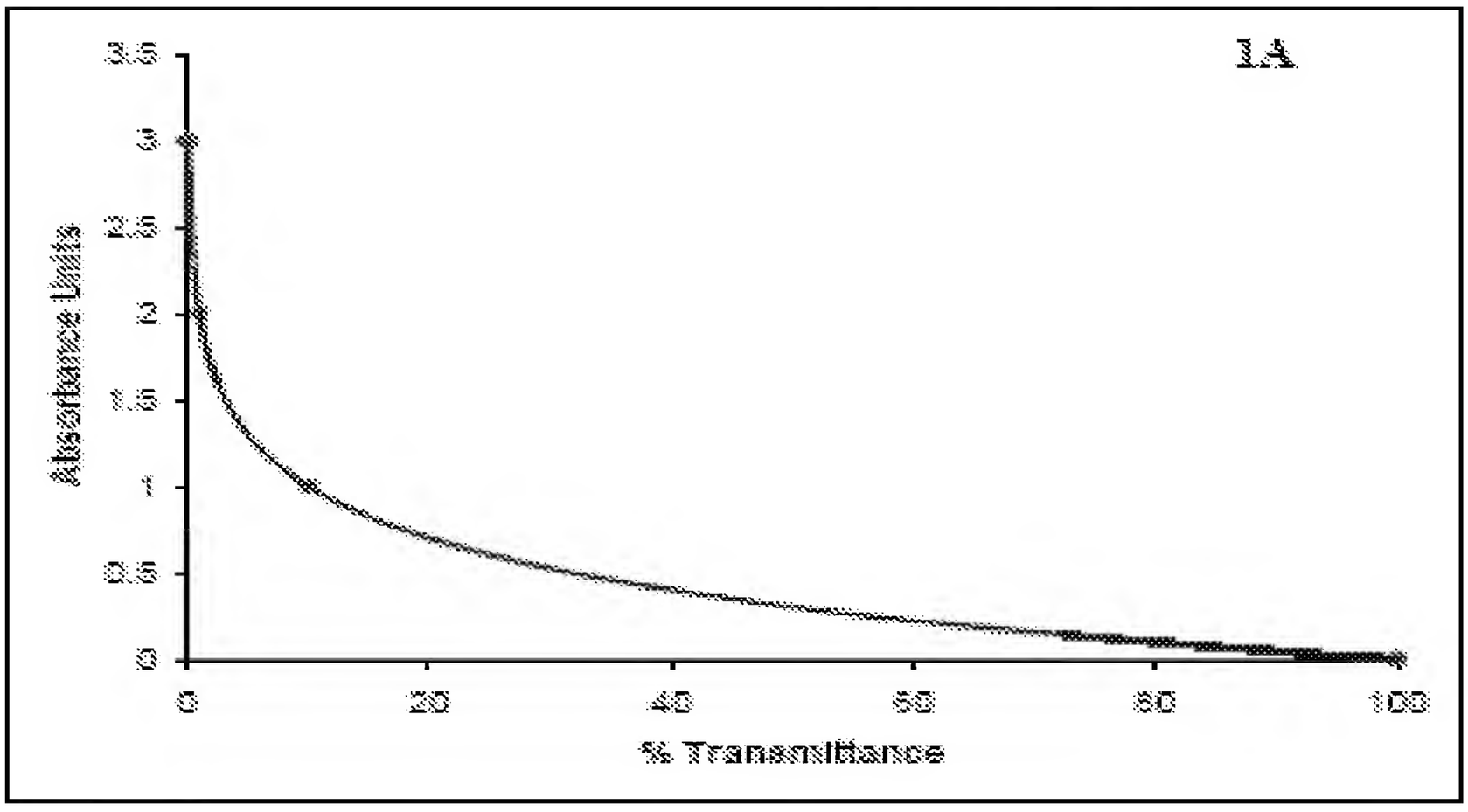
The Examiner alleges that the terms "radiation" and "infrared" as recited in claim 1, lack support in the Applicant's disclosure. While Applicant does not agree with the Examiner's assessment, claim 1 has been amended to recite "optical radiation" in an effort to address the Examiner's concerns.

Regarding the term "infrared", claim 1 recites that the infrared wavelength range is within 2.5 to 50μm. Because the "infrared wavelength" is associated with a range of values, Applicant submits that one of ordinary skill would not attribute the term "infrared" with the "entire infrared spectrum" as alleged. For at least these reasons, Applicant requests that the rejection under 35 U.S.C. §112, first paragraph be withdrawn.

In numbered paragraph 5 on page 3 of the Office action, claims 1, 4, 6-10, 14-18, and 21-22 are rejected under 35 U.S.C. §112, second paragraph for alleged indefiniteness. Applicant respectfully traverses this rejection.

The Examiner alleges that the recitation of "radiation", "high absorbency and emissive characteristics", "low absorbency characteristics", and "high transmissive characteristics", are all indefinite. By amendment, Applicant has addressed the Examiner's concerns regarding the "radiation".

Concerning the other disputed terms, Applicant submits that "absorbency", "emissive", and "transmissive" are all characteristics of material and/or objects that are known in the art. In particular, the absorbency of a material quantifies how much incident light is absorbed by the material. Absorbency is logarithmically related to transmissivity as illustrated in the graph below. *See* "Absorbance", Turner Designs, (http://www.turnerdesigns.com/t2/doc/appnotes/S-0075.pdf).



As shown in the graph, the level of absorbency of a material is measured in increasing value from 0 to 3 AU. Therefore, one of skill in the art would understand that a material or object having an absorbency value closer to 3 would exhibit "high absorbency" and a "low absorbency" at a value closer to 0.

A transmissive value of a material quantifies the amount of incident light that passes through the material. More specifically, the transmissivity measures the percentage of incident light that passes through an object. From the graph above, one of skill would understand that an object with 100% transmissivity allows all incident light to pass, whereas an object or 0% transmissivity allows no light to pass. Transmissivity is related to absorbance such that a material having high transmissivity will have low absorbance and vice versa.

An emissive characteristic of a material quantifies how much heat is radiated by the material based on incident light. One of skill in the art would also understand that emitted energy indicates the temperature of an object, and emissivity can have a value from 0 (shiny mirror) to 1.0 (blackbody). Therefore, a material or object having

high emissivity has a value closer to 1 and an object with low emissivity has a value closer to zero.

Claim 1 and the disclosure provide guidance as to which spectrum range of radiation applies. In particular, the term "high absorbency and emissive characteristics" refers to characteristic in an infrared wavelength range 2.5 to 50μm, low absorbency characteristics are attributed to a solar spectrum range of 200 to 2500 nm, and high transmissive characteristics are achieved in a microwave frequency range of 1 to 30 GHz.

When the guidance provided in Applicant's disclosure is viewed in the context of the knowledge attributed to the skilled artisan, Applicant submits that the terms "high absorbency and emissive characteristics", "low absorbency characteristics", and "high transmissive characteristics" are definite. Thus, withdrawal of this rejection is deemed appropriate.

Relative to claims 7, 8, and 14-20, Applicant has addressed the Examiner's concerns through the enclosed claim amendment. Withdrawal of this rejection thereby, is respectfully requested.

In numbered paragraph 11 on page 4 of the Office Action, claims 1, 4, 6, 9-10, 14, and 21-22 stand rejected under 35 U.S.C. §103(a) for alleged unpatentability over *Kuffer* (U.S. Patent No. 5,327,149) in view of *Jonza et al.* (U.S. Patent No. 5,882,774) with evidence from *Billings et al* (Journal article), *Pauly* (Journal article) and *3M™ Radiant Mirror Film VM2000F1A6 Product Sheet* ("3M Product Sheet"). Applicant respectfully traverses this rejection, as the combination of the applied references does not establish a *prima facie* case of obviousness as alleged.

As shown in Figs. 1-5, Applicant describes an exemplary antenna having an active face on which a thermal control film is disposed. The thermal control film has a polymeric multi-layer structure that includes a set of interference filters. The layer structure of the thermal control film includes a stack of alternating high and low refractive index dielectric films. The thermal control film has a low absorbency of solar radiation, and a high absorbency and emissive characteristic in the infrared wavelength range 2.5μm to 50μm, which corresponds to the spectrum of heat generated by the high frequency circuits of the antenna array. The film also exhibits a high transparency to the microwave frequencies, typically 1 to 30 GHz.

Independent claim 1 broadly encompasses the above-described features.

Kuffer discloses a dual mode, radio frequency, optical-wavelength detector apparatus that focuses optical energy in a wave-length range that includes ultraviolet through infrared wavelengths. The device of *Kuffer* includes primary and secondary mirrors that are designed to be highly reflective to infrared energy and highly transmissive to radio frequency energy. Kuffer, col. 5, lines 29-33.

Kuffer, therefore, cannot exhibit "high absorbency and emissive" characteristics in the infrared wavelength range of 2.5μm to 50μm. Moreover, the film in *Kuffer* is not a thermal control film since it is designed to achieve the objective of reflecting infrared radiation towards a detector. *Kuffer* discloses an antenna in which RF energy is radiated from plural slots to form a desired transmittance beam pattern. The coating is not provided on the active face of the antenna, but rather on a passive mirror in within the housing of the antenna so that the received infrared radiation can be detected by the detector 14. The coating is described as being provided on passive mirrors 11, 13 to reflect light of a particular wavelength towards

the detector. One of ordinary skill would understand that if the coating were provided on the active face, the film would trap heat within the housing of the antenna because of its reflective properties at certain wavelengths.

The reflective film described by *Kuffer* also does not exhibit low absorbency characteristics in the solar spectrum range 200-2500 nm as recited in the claims. By having low absorbency, Applicant's claimed control film can also reflect solar radiation and minimize heat generated by incident light from the sun. Because the film of *Kuffer* is provided to reflect infrared radiation in one of the ranges 3.5 to 5.8 micrometers, 5 to 8 micrometers or 8 to 10 micrometers to the detector, one skilled in the art would understand the film cannot and would not be modified to be reflective in the range of 200-2500 nm and still achieve the design objectives.

The Examiner concedes that *Kuffer* fails to disclose or suggest the use of polymeric multilayer stacks as interference filters.

Jonza discloses an optical film having a multilayered polymeric sheet with alternating layers of polyethylene naphthalate and a polymer that is a reflective polarizer or mirror. The multilayer construction as shown in Fig. 1b includes alternate low and high index thick films having no tuned wavelengths or bandwidth constraints. The preferred multilayer stack ensures that wavelengths that would be most strongly absorbed by the stack are the first wavelengths that would be most strongly absorbed by the stack.

Jonza also discloses that the properties of the film can be modified by stretching the film. However, even if the wavelength of the reflected and detected range of the film described in *Kuffer* could be modified, there would be no motivation for the skilled artisan to do so. In particular, neither the film disclosed in *Jonza* nor

the film disclosed in the *3M Product Sheet* could be substituted for the reflective coating described in *Kuffer* since the films would not reflect radiation in a specified range towards a detector as required by *Kuffer.*

In summary, the combination of *Kuffer*, *Jonza* and the *3M Product Sheet* when applied individually or in combination fail to disclose or suggest every feature recited in Applicant's claims. In particular, none of the applied references discloses or suggests the use of a film that covers an active face of an antenna or a film that exhibits the emissive, absorbance, and transmissive properties of Applicant's claimed control film. Moreover, the applied references fail to disclose or suggest a configuration that removes RF signals and waste heat from an interior of an antenna housing, while also minimizing the effects of incident solar radiation from the sun. For these reasons, a *prima facie* case of obviousness has not been established. Withdrawal of the rejection to claims 1, 4, 6, 9-10, 14, and 21 is respectfully requested.

In numbered paragraphs 15, claims 7, 8, and 15-18 are rejected under 35 U.S.C. §103(a) for alleged unpatentability over *Kuffer* in view of *Jonza* in view of *the 3M Product Sheet, Billings* (Journal article), and *Pauly* (Journal article) Applicant respectfully traverses this rejection.

Claims 7, 8, and 15-18 variously depend from claim 1. By virtue of this dependency, these claims are distinguishable over the applied combination of references because *Billings* and *Pauly* fail to remedy the deficiencies of *Kuffer*, *Jonza* and *the 3M Product Sheet* identified above. Moreover, the subject claims are deemed to be further distinguishable over the applied references due to the

respective additional features recited therein. Withdrawal of this rejection, therefore, is respectfully requested.

CONCLUSION

Based on the foregoing amendments and remarks, Applicant respectfully submits that claims 1, 4, 6-10, 14-18, and 21 are allowable and this application is in condition for allowance. In the event any unresolved issues remain, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

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